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Answer Sheet No. _____

Sig. of Candidate. _____

Sig. of Invigilator. _____

PHYSICS HSSC-I
SECTION – A (Marks 17)

Time allowed: 25 Minutes

NOTE:- Section-A is compulsory. All parts of this section are to be answered on the question paper itself. It should be completed in the first 25 minutes and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

Q. 1 Circle the correct option i.e. A / B / C / D. Each part carries one mark.

- (i) Efficiency of carnot engine can be:
A. zero B. 100% C. maximum D. minimum
- (ii) The dimension of frequency is:
A. $[T^{-1}]$ B. $[LT]$ C. $[LT^{-1}]$ D. $[T]$
- (iii) If $\vec{A} = 2\hat{i}$ and $\vec{B} = 2\hat{j}$ then $\vec{A} \cdot \vec{B}$ is equal to:
A. $4\hat{k}$ B. 2 C. 0 D. 4
- (iv) Which of the following is NOT true?
A. $\vec{u} \times \vec{v} = -\vec{v} \times \vec{u}$ B. $\vec{u} \cdot \vec{v} = \vec{v} \cdot \vec{u}$ C. $\vec{u} \times \vec{v} \neq \vec{v} \times \vec{u}$ D. $\vec{u} \cdot \vec{v} = -\vec{v} \cdot \vec{u}$
- (v) An unpowered and unguided missile is called:
A. Cruise missile B. Remote control missile
C. Simple missile D. Ballistic missile
- (vi) Rate of change of linear momentum is called:
A. Angular momentum B. Torque
C. Force D. Inertia
- (vii) The value of escape velocity is:
A. 11 m/s B. 11 km/s C. 11 km/min D. 11 km/hr
- (viii) The moment of inertia of thin ring or hoop is:
A. mr^{-2} B. mr^2 C. m^2r D. m^2r^2
- (ix) Solar energy at normal incidence outside the Earth's atmosphere is about:
A. 3.4 kW/m² B. 0.4 kW/m² C. 1.4 kW/m² D. 2.4 kW/m²
- (x) The SI unit of coefficient of viscosity is:
A. $kg\ m^{-2}s^{-2}$ B. $Kg\ m^{-1}s^{-2}$ C. $kg\ m^{-1}s^{-1}$ D. $Ns\ m^{-2}$
- (xi) The maximum velocity V_0 of the mass attached to an elastic spring is:
A. $V_0 = x\ \sqrt{k/m}$ B. $V_0 = x_0\ \sqrt{k/m}$ C. $V_0 = x\ \sqrt{m/k}$ D. $V_0 = x_0\ \sqrt{m/k}$
- (xii) The value of γ for air is:
A. 1.40 B. 1.67 C. 1.29 D. 1.25
- (xiii) Error in calculation of Newton's formula for speed of sound is:
A. 17% B. 14% C. 15% D. 16%
- (xiv) When there is phase change of 180°, it means path difference is:
A. 4λ B. $\lambda/2$ C. λ D. 2λ
- (xv) The types of optical fibre are:
A. 5 B. 2 C. 3 D. 4
- (xvi) A spectrometer does not consist of:
A. turntable B. collimeter C. microscope D. telescope
- (xvii) The absolute temperature of the triple point of water is:
A. 273.16 °C B. 273 K C. 273.16 K D. 273 °C

For Examiner's use only:

Total Marks:

17

Marks Obtained:



PHYSICS HSSC-I

Time allowed: 2:35 Hours

Total Marks Sections B and C: 68

NOTE: Answer any fourteen parts from Section 'B' and any two questions from Section 'C' on the separately provided answer book. Use supplementary answer sheet i.e. Sheet-B if required. Write your answers neatly and legibly.

SECTION – B (Marks 42)

Q. 2 Attempt any FOURTEEN parts. The answer to each part should not exceed 3 to 4 lines. (14 x3 = 42)

- (i) Differentiate between precision and accuracy.
- (ii) Under what circumstances would a vector have components that are equal in magnitude?
- (iii) When a rocket re-enters the atmosphere, its nose cone becomes very hot. Where does this heat energy come from?
- (iv) Can there be any acceleration when a body is moving with constant speed.
- (v) Define impulse and show how is it related to linear momentum?
- (vi) Define escape velocity. Write its mathematical expression.
- (vii) Find the rotational K.E and speed of sphere at the bottom of an inclined plane.
- (viii) Show that orbital angular momentum $L_o = mvr$.
- (ix) What are properties of an ideal fluid?
- (x) Differentiate between laminar flow and Turbulent flow?
- (xi) What happens to the time of the simple Pendulum, if its length is increased four times?
- (xii) The speed of sound in air at 0°C is 332 m/s . What will be its speed at 22°C .
- (xiii) What is the effect of pressure on the speed of sound in that medium?
- (xiv) Under what conditions can interference of light take place?
- (xv) What is diffraction grating?
- (xvi) How is the light signal transmitted through the optical fibre?
- (xvii) What is multimode graded index optical fibre?
- (xviii) State the Carnot theorem.
- (xix) How does entropy of a system increase or decrease due to friction?

SECTION – C (Marks 26)

Note: Attempt any TWO questions. All questions carry equal marks.

(2 x 13 = 26)

- Q. 3
- a. Define and explain the Scalar product of two vectors. Also describe three important characteristics of scalar product. (0)
 - b. A force $\vec{F} = 2\hat{i} + 3\hat{j}$ units, has its point of application moved from point $A(1,3)$ to the point $B(5,7)$. Find the work done. (0)
 - c. Name three conditions that could make $\vec{A}_1 \cdot \vec{A}_2 = 0$. (0)
- Q. 4
- a. State and prove Bernoulli's equation in detail. (0)
 - b. Water flows down hill through a closed vertical funnel. The flow speed at the top is 12.0 cm s^{-1} . The flow speed at the bottom is twice the speed at the top. If the funnel is 40 cm long and the pressure at the top is $1.013 \times 10^5\text{ Nm}^{-2}$, what is pressure at the bottom? (0)
 - c. Why fog droplets appear to be suspended in air? (0)
- Q. 5
- a. What is meant by Carnot engine? Calculate the efficiency of an ideal Carnot engine. (0)
 - b. Calculate the entropy change when 1.0 kg of ice at 0°C melts into water at 0°C . Latent heat of fusion of ice $L_f = 3.36 \times 10^5\text{ J kg}^{-1}$. (0)
 - c. Is it possible to construct a heat engine that will not expel heat into the atmosphere? (0)